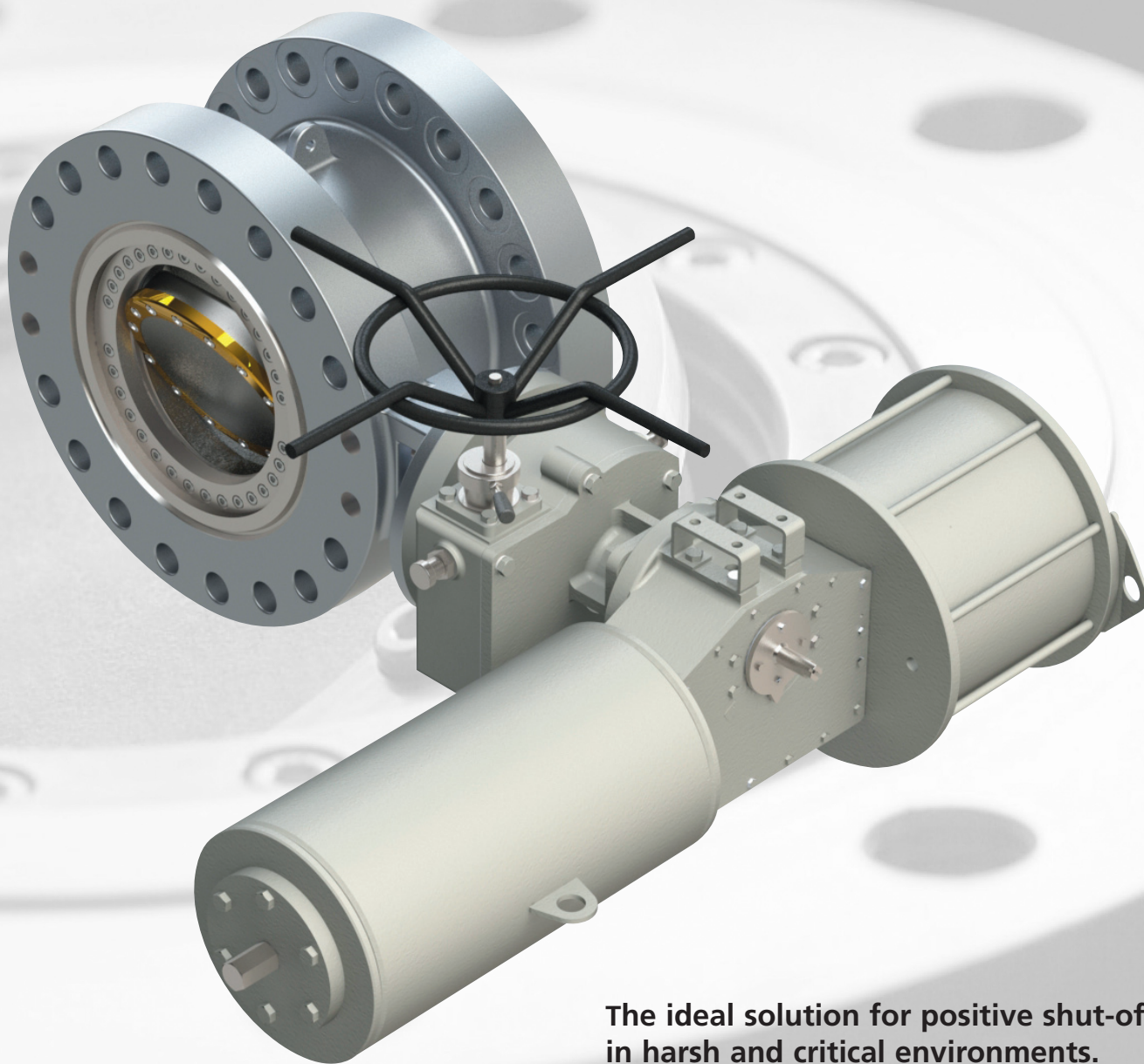


Triple Offset Butterfly Valves

150 to 2500lb



**The ideal solution for positive shut-off
in harsh and critical environments.**

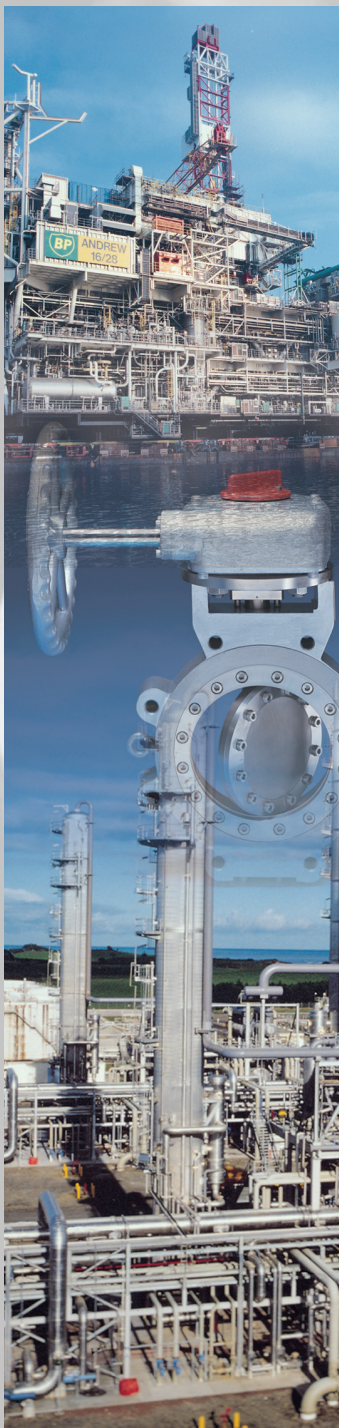
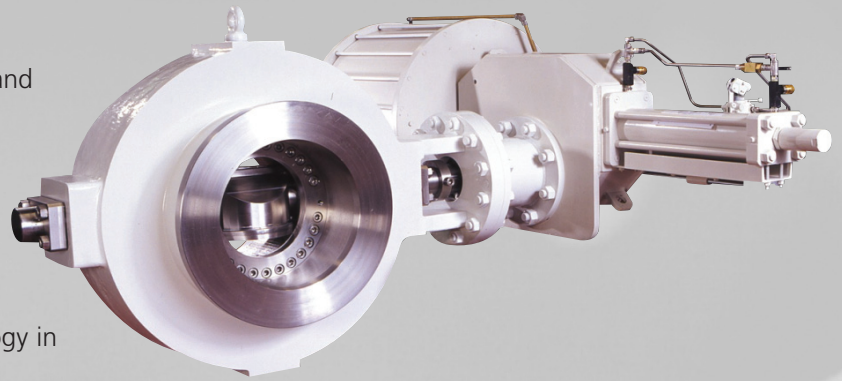
Design features include:

- Frictionless sealing, field replaceable seat and seal, zero leakage and low torque
- Fire tested to API 6FA / API 607 / ISO 10497
- Fugitive Emissions (ISO 15848)
- Available in a wide range of materials
- Customised designs available



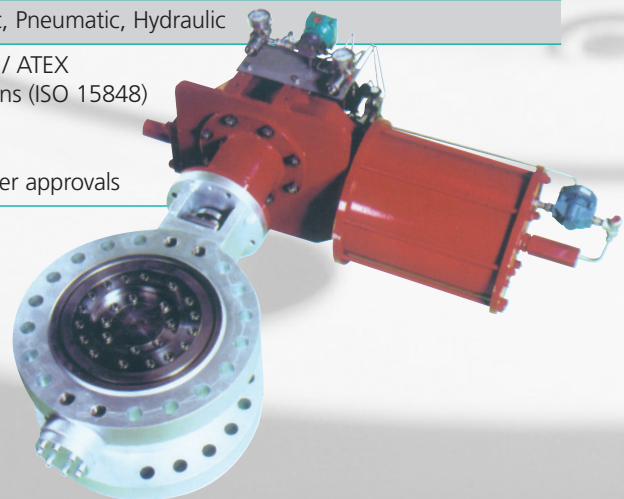
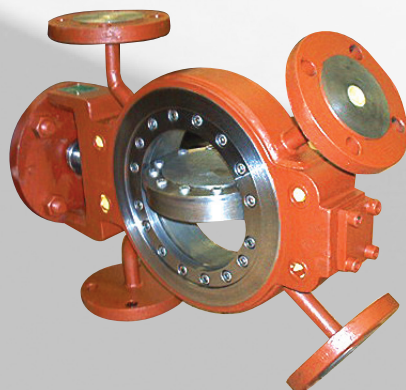
Internationally recognised for product innovation and quality, TRITEC triple offset valves are the ideal solution for positive shut-off or control applications in harsh and critical environments.

Designed for absolute reliability, ease of maintenance and low cost of ownership, the ranges of standard or custom-made valves incorporate the latest valve and materials technology in triple offset design.



Standard Specifications

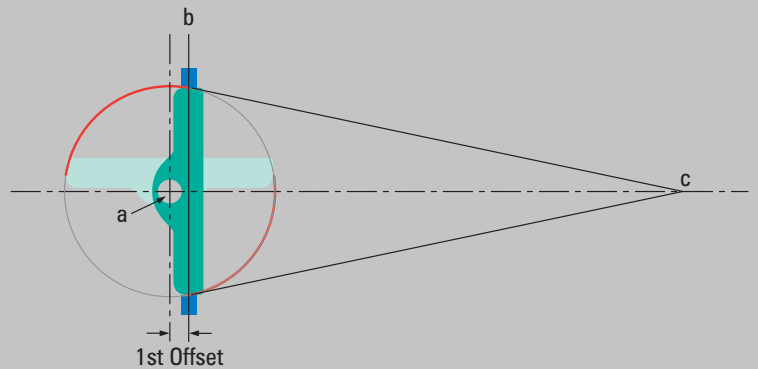
Design	API 609, ANSI B16.34, ASME SEC VIII
Valve sizes	2" (DN 50) to 60" (DN 1500) For larger sizes please contact the sales office
Pressure Classes	ANSI 150 to 1500lb, PN6 to PN250. Higher rating flanges available with de-rated internals (max. internals rating CL 1500)
Body Styles	Lugged / Wafer / Double Flanged / Butt Weld End / Hub End
Flange Accommodation	ANSI B16.5 ANSI B16.47 Series A & B API, AWWA JIS / JPI / Norsok L-005 / Hub end
Face to Face Dimensions	Meet all industry standards API / ANSI / ISO Non-standard face to face available (to customer specification)
Temperature Ratings	Standard: -29°C (-20°F) to +538°C (+1000°F) With selection of suitable materials: -196°C (-320°F) to +800°C (+1292°F)
Valve Testing	Shell Test, Seat Test Fugitive Emission High / Low Pressure Gas
Firesafe	Certified Firesafe to API 607 / API 6FA / ISO 10497
Marking	API 609 / MSS SP-25 / Customer specific
Operators	Manual, Electric, Pneumatic, Hydraulic
Approvals	ISO 9001 / PED / ATEX Fugitive Emissions (ISO 15848) Lloyds Shipside CRN Multiple end user approvals



Tracing the evolution of Triple Offset design

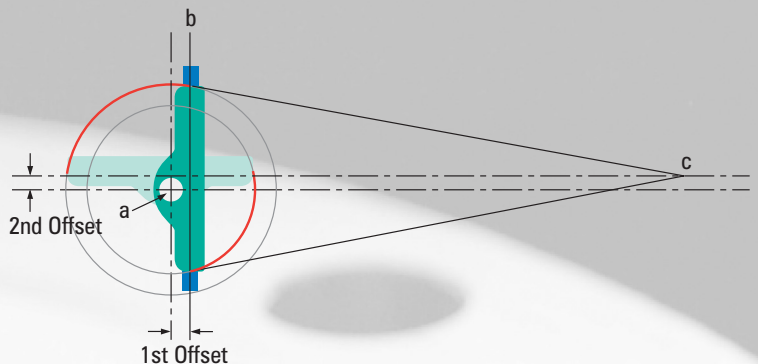
Single Offset

The centre of rotation is moved back from the centreline of the valve disc. The seat and seal are designed conically and on centre. This design relies on a frictional, interference seal and so is applicable only to soft seated valves.



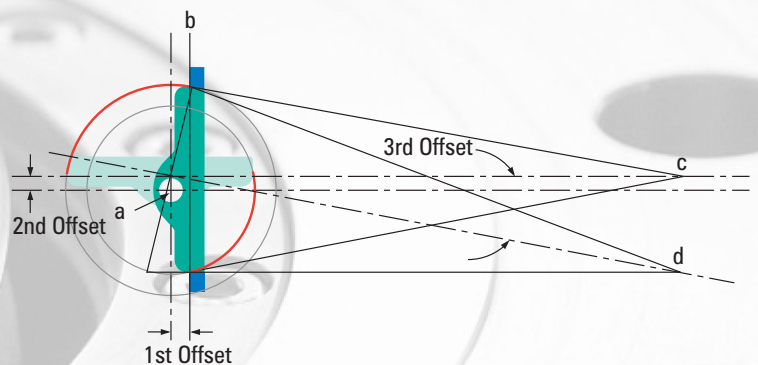
Double Offset

The centre of rotation is moved from the centreline of the valve body. The seat and seal design remains conical and on centre. This design again relies on a frictional, interference seal, but the length of rotation over which this friction occurs is reduced, allowing a larger range of process resistant seat materials to be used. However these materials must be relatively soft or highly elastic to prevent "jamming".



Triple Offset

The centreline of the cone is rotated away from the valve centreline resulting in an ellipsoidal profile and providing the third offset. With this geometry, seat seal interference is completely eliminated ensuring long sealing life. The result is a torque seated, process pressure aided FRICTIONLESS seal. The geometry allows the body seat to be used as the closed limit stop, aiding operator adjustment. The Triple Offset design is ideally suited to metal seated valves providing bubble-tight performance on high temperature, high pressure and firesafe applications.

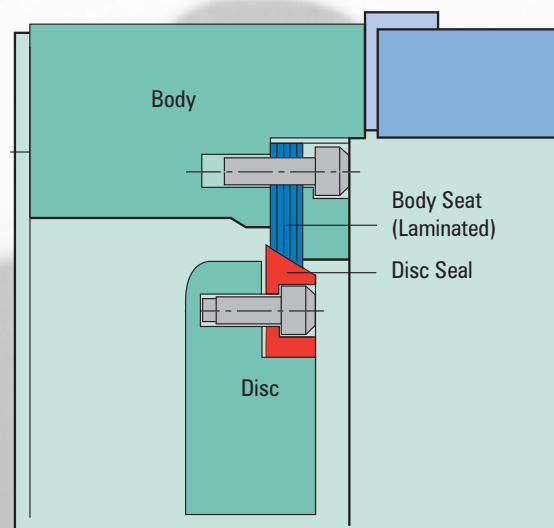


Features of the Tritec Valve

Triple offset geometry results in:

- Bi-directional zero leakage
- Firesafe
- Zero seat/seal friction
- Low torques
- Continued sealing through thermal cycling
- Excellent flow and throttling characteristics
- Excellent control of fugitive emissions by virtue of rotary stem movement and advanced packing materials
- Client specific testing available on request
- Firesafe to API 6FA / API Std 607 / ISO 10497
- Available fully rated to Class 1500lb
- Fully rated for end of line duty
- Wide range of materials available
- Laminated seat is mounted in the body, removing it from the erosive effects of the flowing media
- Disc seal can be hard-faced to provide extended service life on erosive duties
- Both seat and seal are field replaceable without special tools
- ISO mounting flange allows easy fitting and changing of operators

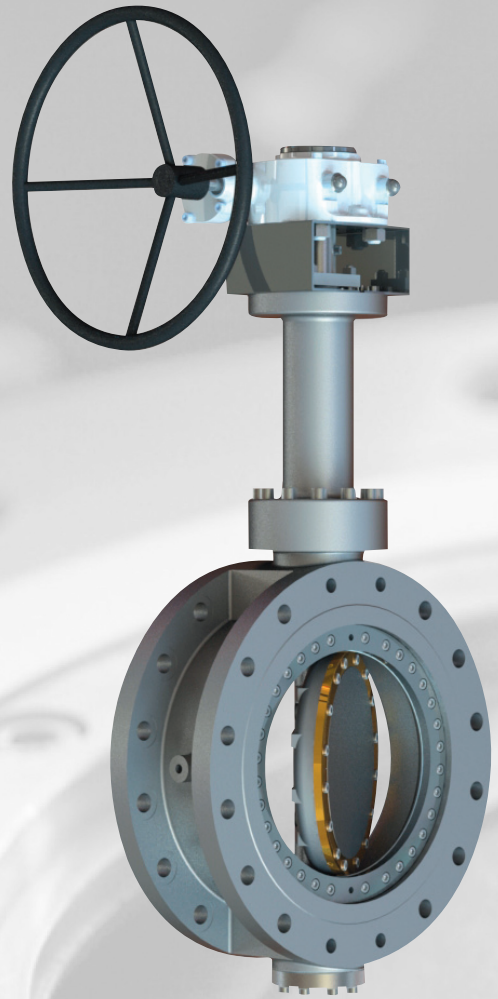
- Cavitation and noise reduction baffle plates are available to compliment the Tritec valve under high pressure drop and/or high noise process conditions



Cryogenic Butterfly Valve

The need for positive, verifiable, maintainable shut-off in critical applications has led to the wide-spread use of triple offset butterfly valves in cryogenic applications. Traditionally these valves have been ball or plug valves, both of which penalise the user in terms of weight, operating torque, initial material cost and of course maintainability that translates into cost of ownership. The Tomoe Tritec 'Cryseal' range incorporates a triple offset high performance butterfly valve designed specifically to meet the requirements of international Cryogenic Valve standards, including BS6364(1984) and Shell SPE 77/306.

The Cryseal range has been extensively used on applications including low temperature gas and liquid service (Liquid Nitrogen, Oxygen & Hydrogen), LNG Tankers on process duties, Onshore LNG Production Plants and Onshore Gas Distribution Terminals.



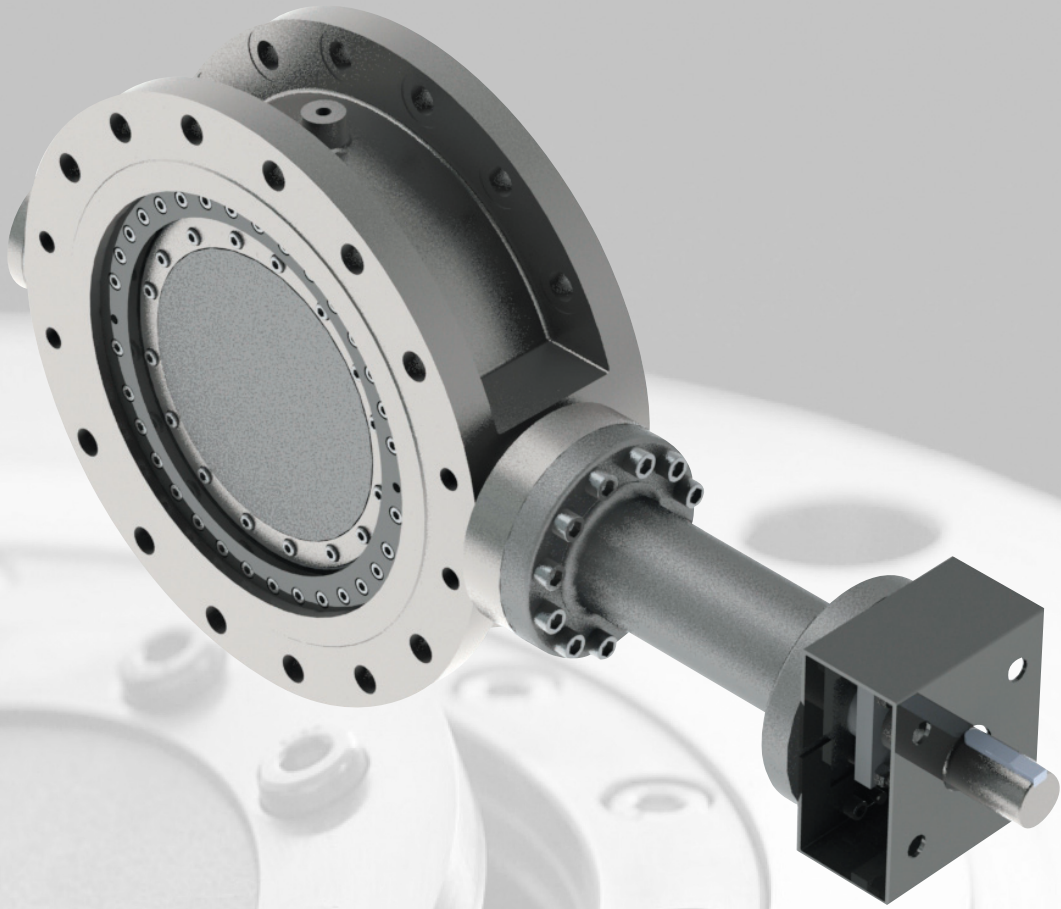
Benefits

- Full pressure rating up to Class 300
- Operating Temperature range to -196°C
- Firesafe to BS6755 part2, API 6FA, API 607 4th edition
- Field replaceable Body Seat and Disc Seal
- 1 piece shaft, no linkage or potential point of failure
- Anti blow-out mechanism
- Extension bonnet dowelled both to valve and operator to eliminate loss of torque

Options

- Helium Gland Emission testing available to EPA21, ISA-SP-93, ANSI/FCI 91-1, ISO15848
- Standard extension bonnet length to BS6364 with other extension bonnet lengths to customer order.
- Any face to face, no pipe modifications required.
- Buttweld with top entry port.

Cryogenic Butterfly Valve



Cryogenic Valve Bill of Materials

Component	For applications to -196°C
Body	A351 CF8M
Disc	A351 CF8M
Body Seat	Inconel 625/Graphite Laminate
Body Seat Retainer	316 Stainless Steel
Disc Seal	316 Stainless Steel
Shaft	Inconel 718
Shaft Pins	Inconel 718
Bearings	CR/316SS
Thrust Ring	CR/316SS
End Cover	316 Stainless Steel
Gland Plate	316 Stainless Steel
Gaskets	Graphite
Mounting Plate	Steel
Fixings	316 Stainless Steel
Gland packing	Graphite

Hydrofluoric Acid Applications

FIRESAFE DESIGN

Fire tested in accordance with
API 607 / ISO 10497

REPEATABLE ISOLATION

Non-friction seat and seal ensures
repeatable sealing performance

FIELD REPLACEABLE SEAT AND SEAL

Ensures maintenance costs and
plant downtime are kept to a
minimum

LOW FUGITIVE EMISSIONS

Valve design tested and certified in
accordance with ISO 15848-1

APPLICATIONS

Acid Circulating Pump
Discharge/Suction

Fresh Acid Pump Discharge/Suction

Settle Acid Pump
Discharge/Suction

Feed Line

Olefin feed to reactors

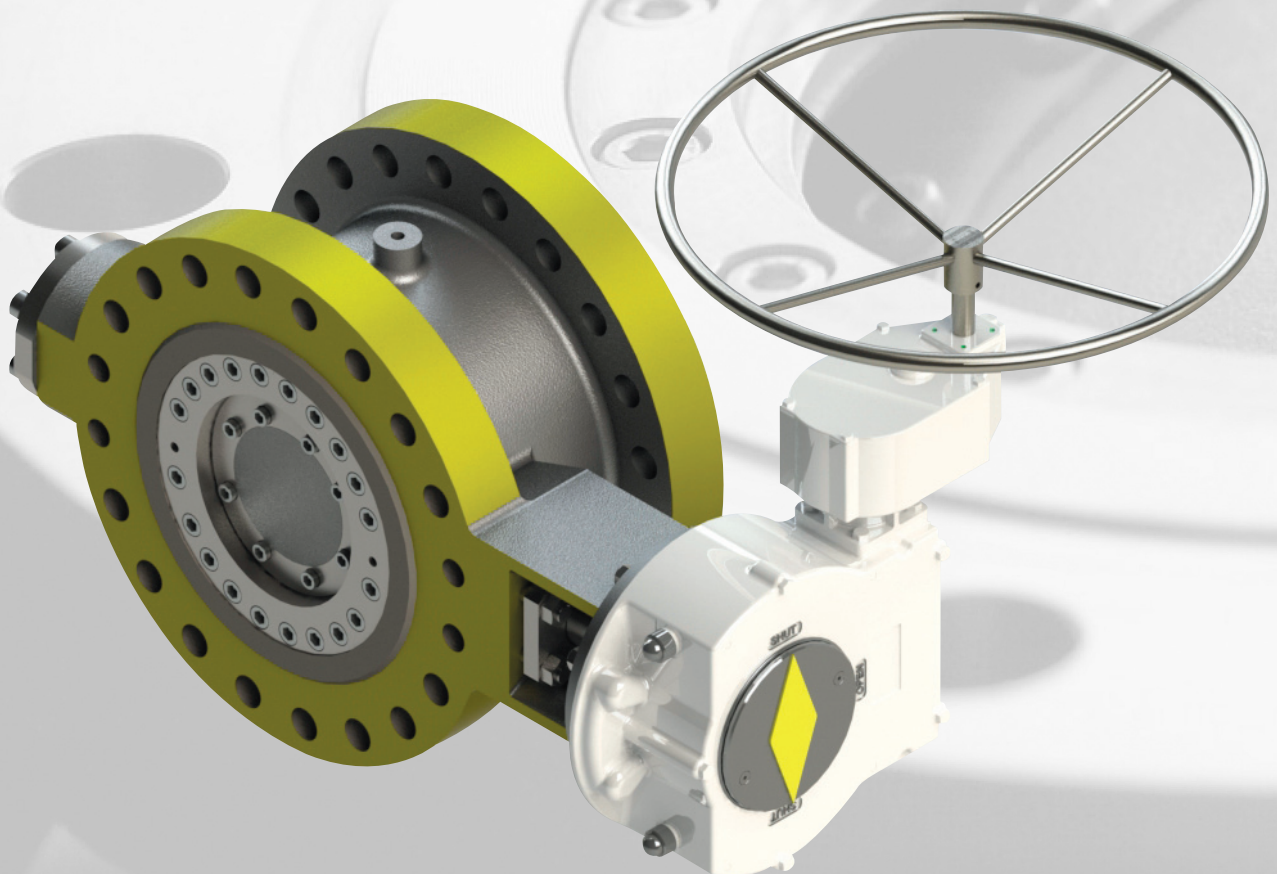
Acid Settler Drain

Alkylation Reactor Drain

Acid dump drum inlet

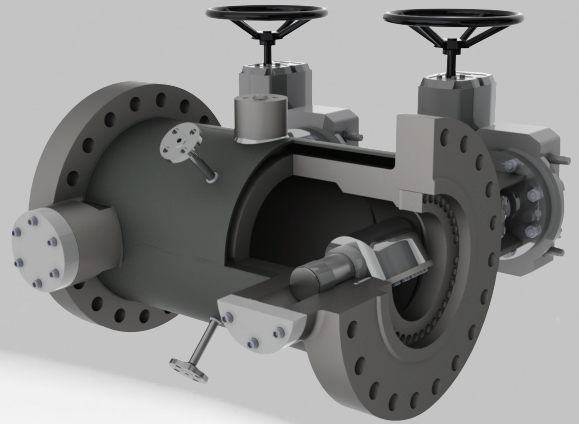
Acid unloading line

Rapid acid transfer



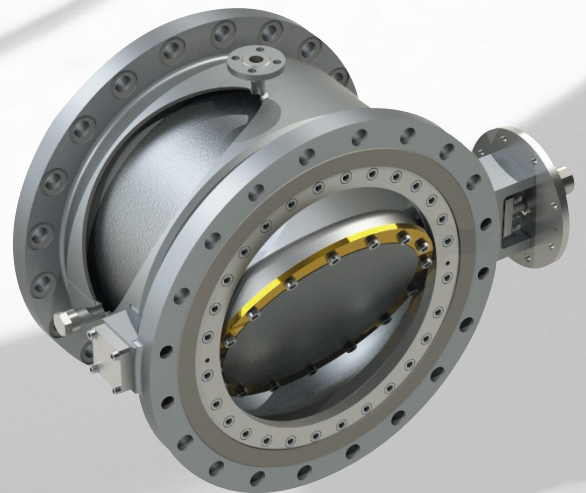
Features of the Tritec Double Isolation Valve

- Positive, verifiable, repeatable isolation
- Sizes: 2in to 48in
- Fully rated to Class 1500
- Field replaceable seat and seal
- Firesafe to API 607 / API 6FA / ISO 10497
- Lower cost of ownership than two single isolating valves
- Available in any material to suit client process conditions
- Fully rated for end of line duty
- Bleed connection to suit client requirements
- End connections to suit client requirements (RF, FF, RTJ, Norsok L-005, Hub end, API)
- Non-standard face to face dimensions available
- One piece cast or forged body thus minimising potential leak paths
- Custom designs to suit client requirements
- Compact design that offers space and weight saving over conventional DBB valve configurations



Steam Jacketed Butterfly Valve

- Firesafe to API 607 / ISO 10497
- Fully Rated to Class 1500
- Available with Class 2500 flanges (Class 150 to 1500 rated internals)
- Available in any material to suit client process conditions
- Field replaceable seat and seal
- Lower operating torques
- End connections to suit client requirements
- Sizes: 2in to 60in
- Non-standard face to face dimensions available
- Custom designs to suit client requirements
- Optional steam tracing in shaft





TOMOE valves can be found in operation in a vast range of industries worldwide, both on-shore and off-shore, providing unsurpassed levels of leak tightness and wear resistance and making a valuable contribution to overall process efficiency.



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